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Product Information

DATE : 08.Mar.2010

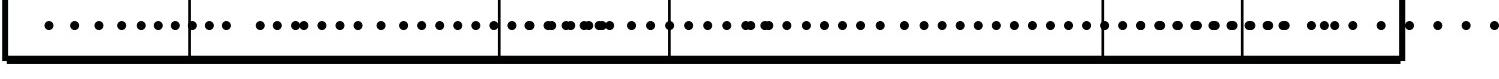
SAMSUNG TFT-LCD**MODEL : LTI700HD01**

The Information Described in this Specification is Preliminary and can be changed without prior notice

..... DATE 08.Mar.2010 DATE 08.Mar.2010
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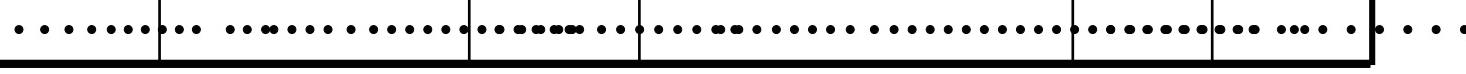
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Samsung Confidential*** Revision History**

Date	Rev. No	Page	Summary
Feb 09, 2009	000	all	First issued
Apr 06, 2009	001	7	Color Gamut Typ : 72% • 77%
		11	Lamp Voltage Min : 2100Vrms • 935Vrms
Jun 08, 2009	002	12	Input Current : Max 24A • Typ 24A



General Description

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Description

LTI700HD01 is a color active matrix liquid crystal display (LCD) that uses amorphous silicon TFT(Thin Film Transistor) as switching components. This model is composed of a TFT LCD panel, a driver circuit and a backlight unit. The resolution of a 70.0" is 1920 x 1080 and this model can display up to 16.7 million colors with wide viewing angle of 89° or higher in all directions. This panel is intended to support applications to provide a excellent performance for Flat Panel Display such as Home-alone Multimedia TFT-LCD TV, Display terminals for AV application products, and Digital Information Display (DID).

Features

- RoHS compliance (Pb-free)
- High contrast ratio, High aperture ratio, High luminance
- SPVA(Super Patterned Vertical Align) mode
- Wide viewing angle (-178°)
- High speed response
- Portrait / Landscape type compatible
- Wide UXGA (1920 x 1080 pixels) resolution (16:9)
- Low power consumption
- Direct Type 64 CCFTs(Cold Cathode Fluorescent Tube)
- DE(Data Enable) mode
- LVDS (Low Voltage Differential Signaling) interface (2pixel/clock)

General Information

Items	Specification	Unit	Note
Module Size	1630.0(W _{TYP}) x 952.0(H _{TYP})	mm	• 1.0mm
	83.6(D _{MAX})		
Weight	47,500(Max.)	g	
Pixel Pitch	0.807(H) x 0.807(V)	mm	
Active Display Area	1549.44(H) x 871.56(V)	mm	
Surface Treatment	Haze 44% , Hard-coating (3H)		
Display Colors	8 bit - 16.7M	colors	
Number of Pixels	1920 x 1080	pixel	
Pixel Arrangement	RGB vertical stripe		
Display Mode	Normally Black		
Luminance of White	600 (Typ.)	cd/m ²	



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1. Absolute Maximum Ratings

If the condition exceeds maximum ratings, it can cause malfunction or unrecoverable damage to the device.

Item	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	V_{DD}	GND-0.5	13.2	V	(1)
Storage temperature	T_{STG}	-20	60	• •	(2)
Glass surface temperature (Operation)	Center	T_{CENTER}	0	50	(2),(5)
	T. Uniformity	• T	-	10	
Shock (non - operating)	S_{nop}	-	30	G	(3)
Vibration (non - operating)	V_{nop}	-	1.5	G	(4)

Note (1) $T_a = 25 \pm 2^\circ C$

(2) Temperature and relative humidity range are shown in the figure below.

- a. 90 % RH Max. ($T_a = 39^\circ C$)
- b. Relative Humidity is 90% or less. ($T_a > 39^\circ C$)
- c. No condensation

(3) 11ms, sine wave, one time for • X, • Y, • Z axis

(4) 10-300 Hz, Sweep rate 10min, 30min for X,Y,Z axis

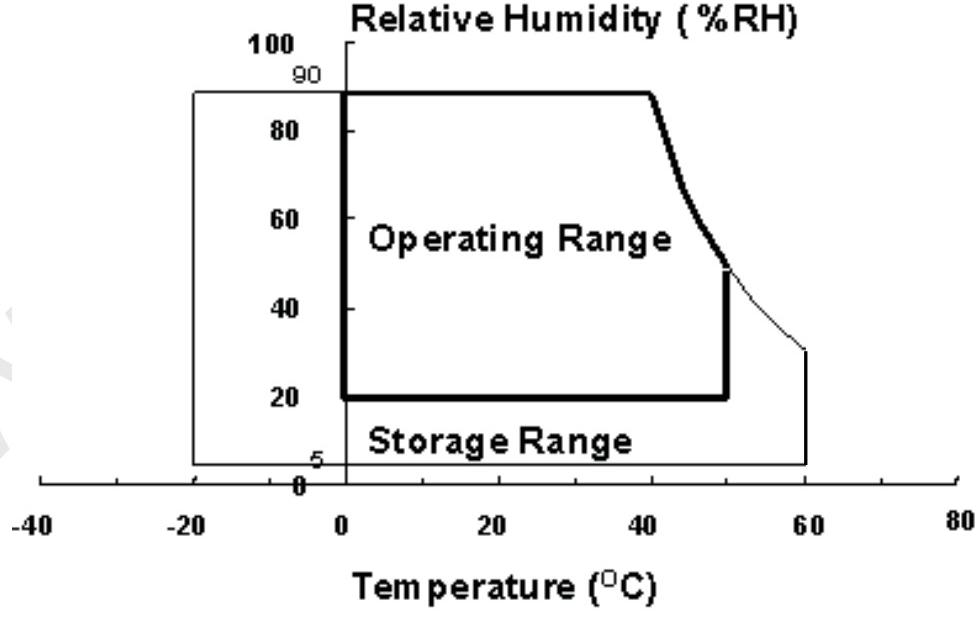
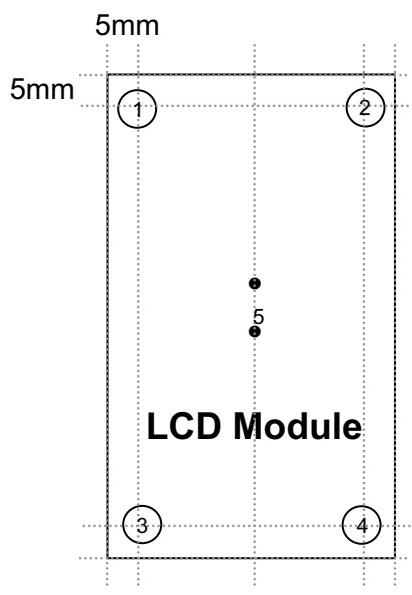


Fig. Temperature and Relative humidity range

(5) Definition of test point

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- \bar{T} should be less than 10° • ($\bar{T} = |T_{\text{CENTER}} - T_{\text{CORNER}}|$)

T_{CENTER} : Temperature of the center of the glass surface
(Test point 5)

T_{CORNER} : Temperature of each edge of the glass surface
(Test point 1~4)

2. Application information for DID (Digital Information Display)

A long-term display like DID application may cause uneven display including image retention.
To optimize module's lifetime and function, several operating usages are required.

1. Normal operating condition

- Temperature: 20° ~ 15°
- Humidity: 55% ~ 20%
- Display pattern: moving picture or regular switch-over display

Note) Long-term static information image may cause uneven display.

2. Operating usages under abnormal operating condition. Note (1)

a. Ambient condition

- Well-ventilated place is recommended to set up DID system.

b. Power off and screen saver

- Periodical power-off or screen saver is needed after long-term static display. Note (2)

3. Operating usages to protect uneven display due to long-term static information display

- Suitable operating time for P-DID : under 20 hours a day.
- Periodical display contents change from static image to moving picture.
- Liquid crystal refresh time is required.
- Periodical background color and character (image) color change
 - Use different colors for background and character (image), respectively.
 - Change colors periodically.
- Avoid combination of background and character with large different luminance.

Note (1) Abnormal condition means every operating condition except normal operating condition.

Note (2) Moving picture or black pattern is strongly recommended for screen saver.

4. Lifetime in this spec is guaranteed only when DID is used under right operating usages.



3. Optical Characteristics

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The optical characteristics should be measured in a dark room or equivalent.

Measuring equipment : TOPCON BM-7, SPECTRORADIOMETER SR-3

($T_a = 25 \pm 2^\circ C$, $V_{DD} = 12V$, $f_v = 60Hz$, $f_{DCLK} = 148.5MHz$, $I_L = 11.0mA$)

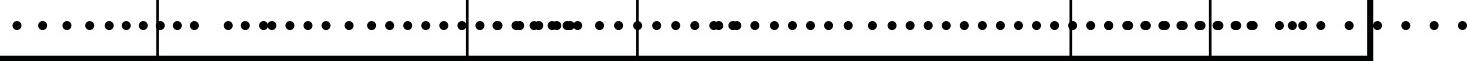
Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note		
Contrast Ratio (Center of screen)	C/R	Normal $\theta_{L,R}=0^\circ$ $\theta_{U,D}=0^\circ$	1800	2000	-		(3) SR-3		
Response Time	Rising		-	10	13	msec	(5) BM-7		
	Falling		-	6	7				
	G-to-G		-	8	10				
Luminance of White (Center of screen)	Y_L		500	600	-	cd/m ²	(6) SR-3		
Color Chromaticity (CIE 1931)	Red	Viewing Angle	TYP. -0.03	0.654	TYP. +0.03	(7),(8) SR-3			
				0.336					
	Green			0.272					
				0.610					
	Blue			0.145					
				0.060					
	White			0.280					
				0.290					
Color Gamut	-			77		%	(7) SR-3		
Color Temperature	-			10,000		K	(7) SR-3		
Viewing Angle	Hor.	C/R • 10	θ_L	75	89	-	(8) SR-3		
			θ_R	75	89	-			
	Ver.		θ_U	75	89	-			
			θ_D	75	89	-			
Brightness Uniformity (9 Points)	B_{uni}		-	-	25	%	(4) SR-3		

Note (1) Test Equipment Setup

The measurement should be executed in a stable, windless and dark room between 40min and 60min after lighting the backlight at the given temperature for stabilization of the backlight. This should be measured in the center of screen.

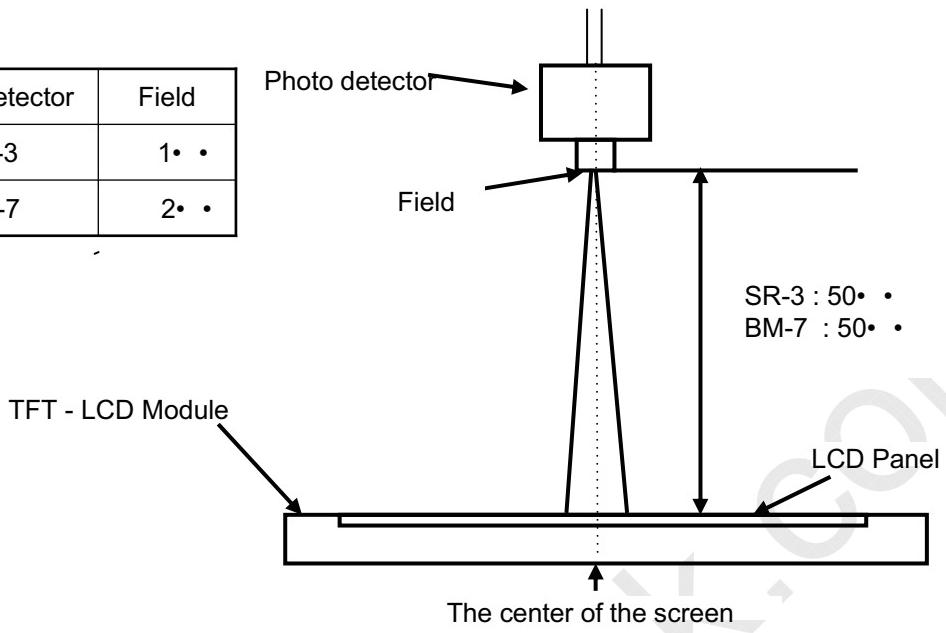
Single lamp current : 11.0mA

Environment condition : $T_a = 25 \pm 2^\circ C$

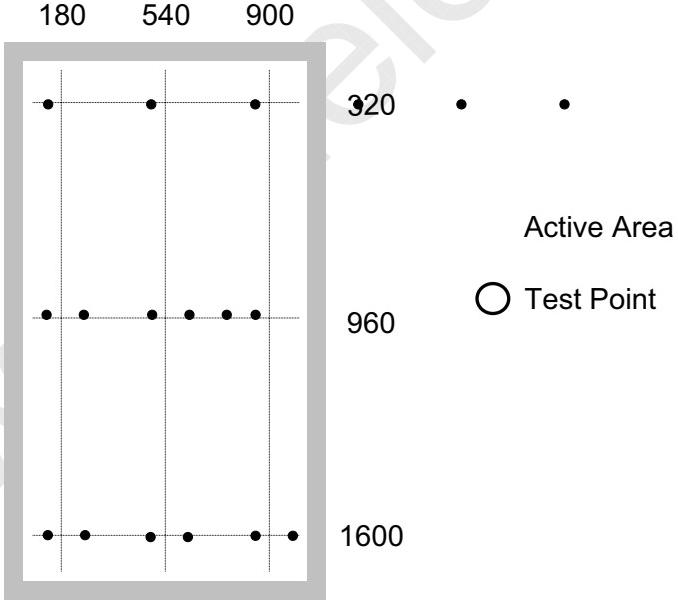


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Photo detector	Field
SR-3	1• •
BM-7	2• •



Note (2) Definition of test point



Note (3) Definition of Contrast Ratio (C/R)

: Ratio of gray max (Gmax) & gray min (Gmin) at the center point ⑤ of the panel

$$C / R = \frac{G_{\max}}{G_{\min}}$$

Gmax : Luminance with all pixels white

Gmin : Luminance with all pixels black



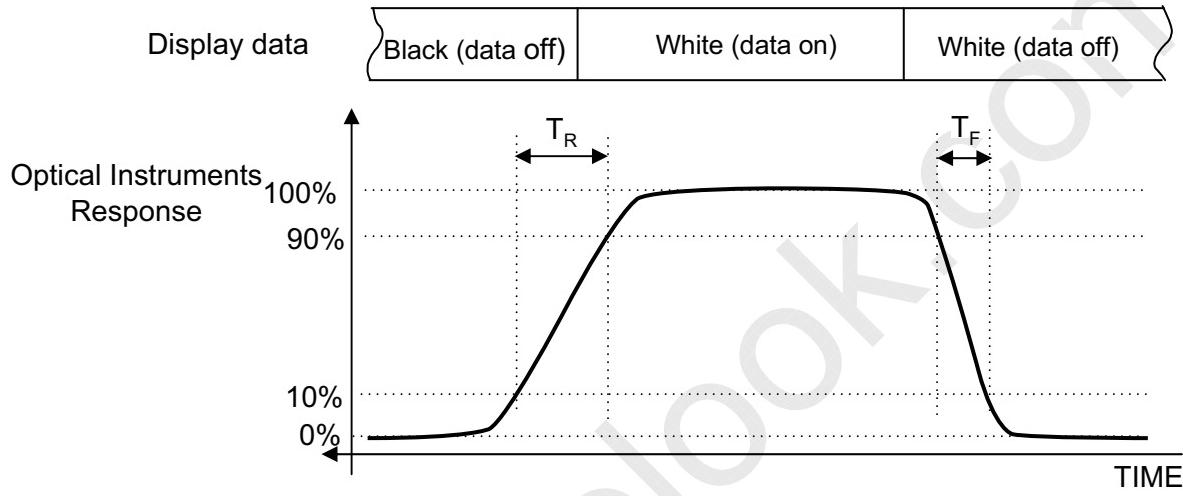
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Note (4) Definition of 9 points brightness uniformity

$$B_{uni} = 100 * \frac{(B_{max} - B_{min})}{B_{max}}$$

Bmax : Maximum brightness
Bmin : Minimum brightness

Note (5) Definition of Response time : Sum of Tr, Tf



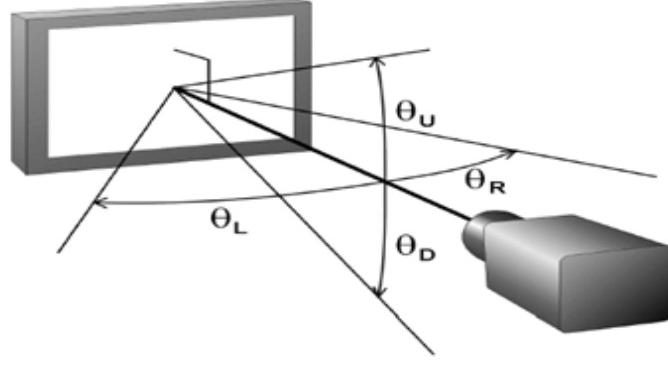
Note (6) Definition of Luminance of White : Luminance of white at center point ⑤

Note (7) Definition of Color Chromaticity (CIE 1931)

Color coordinate of Red, Green, Blue & White at center point ⑤

Note (8) Definition of Viewing Angle

: Viewing angle range (C/R • •10)



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4. Electrical Characteristics

4.1 TFT LCD Module

The connector for display data & timing signal should be connected.

T_a = 25°C • •2 •C

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Voltage of Power Supply	V _{DD}	10.8	12.0	13.2	V	(1)
Current of Power Supply	I _{DD}	-	1050	-	mA	(2),(3)
		-	1100	-	mA	
		-	1650	1900	mA	
Vsync Frequency	f _V	-	60	-	Hz	
Hsync Frequency	f _H	55.0	67.5	72.0	kHz	
Main Frequency	f _{DCLK}	120.0	148.5	160.0	MHz	
Rush Current	I _{RUSH}	-	-	7	A	(4)

Note (1) The ripple voltage should be controlled under 10% of V_{DD}.

(2) f_V = 60Hz, f_{DCLK} = 148.5MHz, V_{DD} = 12.0V, DC Current.

(3) Power dissipation check pattern (LCD Module only)

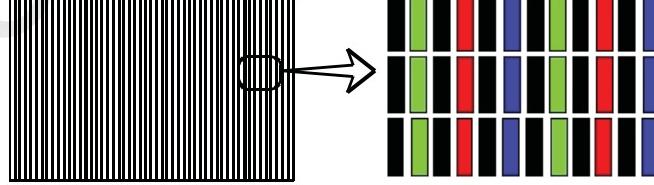
a) Black Pattern



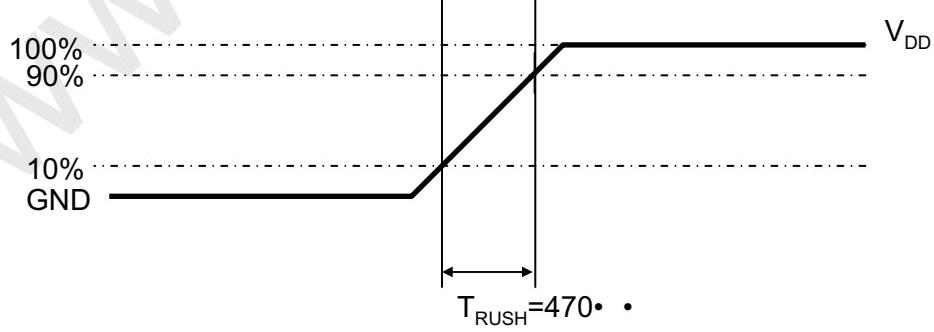
b) White Pattern



c) N-Pattern



(4) Measurement Conditions



Rush Current I_{RUSH} can be measured when T_{RUSH} is 470ms.



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4.2 Back Light Unit

The backlight unit contains 64 direct-lighting type CCFTs (Cold Cathode Fluorescent Tube). The characteristics of lamps are shown in the following tables.

Ta=25 • 2•C

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Lamp Current	I _L	10.0	11.0	12.0	mArms	
Lamp Voltage	V _L	935	-	-	Vrms	
Operating Life Time	Hr	50,000	-	-	Hour	(1)

Note (1) It is defined as the time to take until the brightness reduces to 50% of its original value.

[Operating condition : Ta = 25• 2• ; IL = 11.0mArms, For single lamp only]

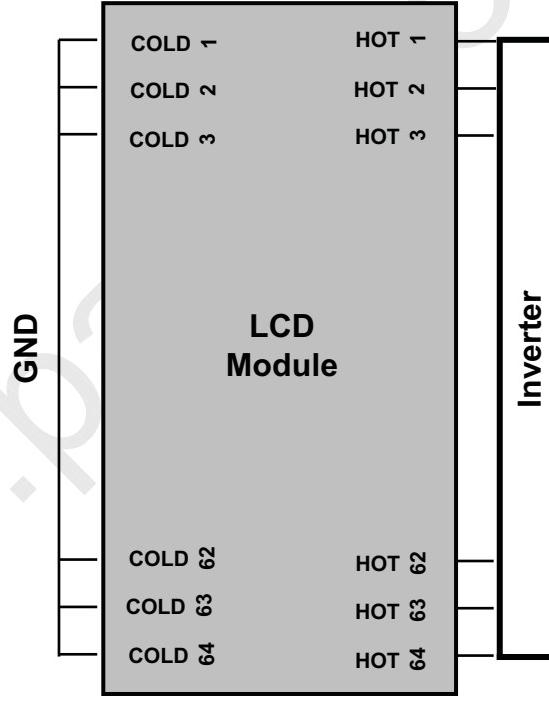


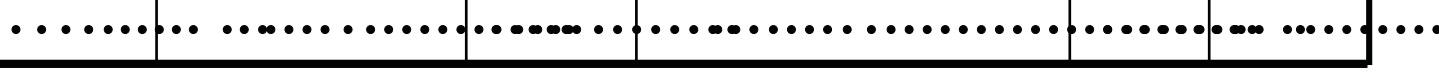
Fig. Rear view

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4.3 Inverter Input Condition & Specification

Items	Symbol	Conditions	Specifications			Unit	Note
			Min.	Typ.	Max.		
Input Voltage	V _{in}	-	21.6	24.0	26.4	V	T _a =25°
Input Current	I _{in}	V _{in} = 24.0V V _{dim} = 3.3V	-	24	-	A	
Lamp Current	I _{O,MAX}	V _{dim} = 3.3V	10.0	11.0	12.0	mArms	After 1 hour Warm-up
Frequency	F _{LAMP}	V _{in} = 24.0V V _{dim} = 3.3V	42	44	46	kHz	
Backlight On/Off	ON	V _{in} = 24.0V	2.4	-	5.25	V	-
	OFF		0	-	0.8		
Dimming Control	V _{DIM}	Max Lum	3.3	-	-	V	-
		Min. Lum	-	-	0		

Note (1) Power Consumption is measured at 600[cd/m²] of luminance condition which is the typical luminance value. Lamp Current is measured at the point before Lamp.



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5. Input Terminal Pin Assignment

5.1 Input Signal & Power

Connector : FI-RE51S-HF (JAE)

PIN No.	Description		PIN No.	Description
1	Odd LVDS Signal	Vdd (12V)	26	RE[0]P
2		Vdd (12V)	27	RE[1]N
3		Vdd (12V)	28	RE[1]P
4		Vdd (12V)	29	RE[2]N
5		Vdd (12V)	30	RE[2]P
6		No Connection	31	GND
7		GND	32	RECLK-
8		GND	33	RECLK+
9		GND	34	GND
10		RO[0]N	35	RE[3]N
11		RO[0]P	36	RE[3]P
12		RO[1]N	37	No Connection
13		RO[1]P	38	No Connection
14		RO[2]N	39	GND
15		RO[2]P	40	No Connection
16		GND	41	No Connection
17		ROCLK-	42	No Connection
18		ROCLK+	43	No Connection
19		GND	44	No Connection
20		RO[3]N	45	LVDS Option
21		RO[3]P	46	No Connection
22	No Connection		47	No Connection
23	No Connection		48	No Connection
24	GND		49	No Connection
25	Even LVDS	RE[0]N	50	No Connection
			51	No Connection

Note(1) No Connection :These pins are only used for SAMSUNG internal purpose.

(2) LVDS Option : High (3.3V) • Normal LVDS format

: Low (GND) or Open (N.C) • JEIDA LVDS format

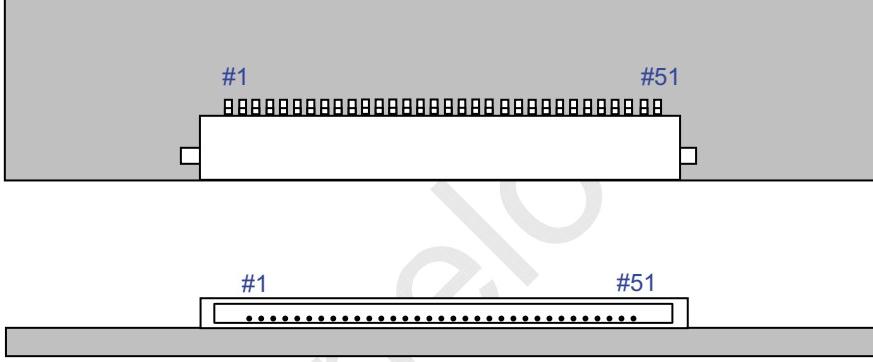
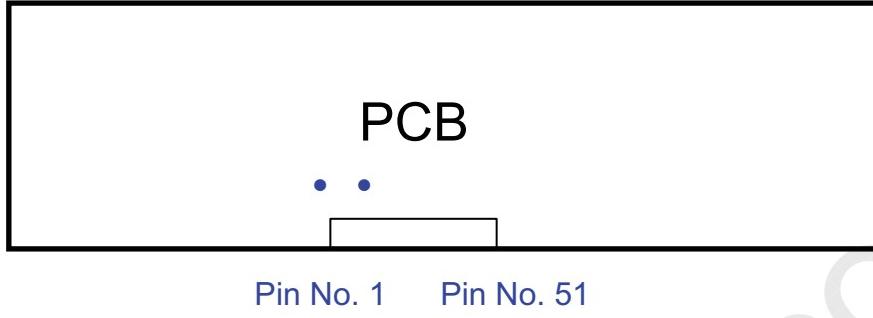
Sequence :On = V_{DD} • LVDS Option • Interface Signal

Off = Interface Signal • LVDS Option • V_{DD}



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Note (3) LVDS Connector

**Fig. Connector diagram**

- a. All GND pins should be connected together and also be connected to the LCD's metal chassis.
- b. All power input pins should be connected together.
- c. All N.C pins should be separated from other signal or power.



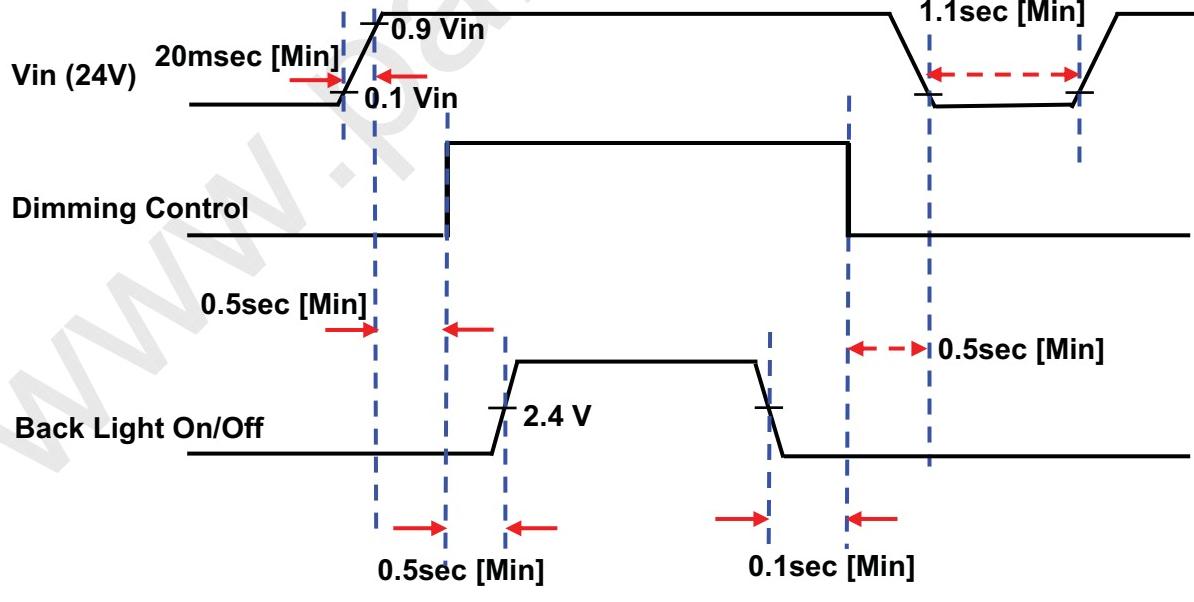
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5.2 Inverter Input Pin Configuration

Connector : YEON HO, 20022WR-14AML

Pin No.	Pin Configuration(FUNCTION)
1	Vin (24V)
2	Vin (24V)
3	Vin (24V)
4	Vin (24V)
5	Vin (24V)
6	GND
7	GND
8	GND
9	GND
10	GND
11	No Connection
12	Backlight On /Off [On: 2.4 ~ 5.25V, Off: 0 ~ 0.8V]
13	Dimming Control [0V: Min, 3.3V: Max]
14	No Connection

5.3 Inverter Input Power Sequence



5.4 LVDS Interface

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- LVDS Receiver : Tcon (merged)
 - Data Format (JEIDA & Normal)

Default LVDS Option : JEIDA

	LVDS pin	JEIDA -DATA	VESA -DATA
TxOUT/RxIN0	TxIN/RxOUT0	R2	R0
	TxIN/RxOUT1	R3	R1
	TxIN/RxOUT2	R4	R2
	TxIN/RxOUT3	R5	R3
	TxIN/RxOUT4	R6	R4
	TxIN/RxOUT6	R7	R5
	TxIN/RxOUT7	G2	G0
TxOUT/RxIN1	TxIN/RxOUT8	G3	G1
	TxIN/RxOUT9	G4	G2
	TxIN/RxOUT12	G5	G3
	TxIN/RxOUT13	G6	G4
	TxIN/RxOUT14	G7	G5
	TxIN/RxOUT15	B2	B0
	TxIN/RxOUT18	B3	B1
TxOUT/RxIN2	TxIN/RxOUT19	B4	B2
	TxIN/RxOUT20	B5	B3
	TxIN/RxOUT21	B6	B4
	TxIN/RxOUT22	B7	B5
	TxIN/RxOUT24	HSYNC	HSYNC
	TxIN/RxOUT25	VSYNC	VSYNC
	TxIN/RxOUT26	DEN	DEN
TxOUT/RxIN3	TxIN/RxOUT27	R0	R6
	TxIN/RxOUT5	R1	R7
	TxIN/RxOUT10	G0	G6
	TxIN/RxOUT11	G1	G7
	TxIN/RxOUT16	B0	B6
	TxIN/RxOUT17	B1	B7
	TxIN/RxOUT23	RESERVED	RESERVED

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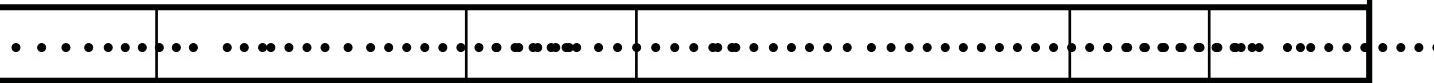
5.5 Input Signals, Basic Display Colors and Gray Scale of Each Color

COLOR	DISPLAY (8bit)	DATA SIGNAL																					GRAY SCALE LEVEL	
		RED							GREEN							BLUE								
		R0	R1	R2	R3	R4	R5	R6	R7	G0	G1	G2	G3	G4	G5	G6	G7	B0	B1	B2	B3	B4	B5	B6
BASIC COLOR	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
	BLUE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1
	GREEN	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	-
	CYAN	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-
	RED	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
	MAGENTA	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	-
	YELLOW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	-
	WHITE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-
GRAY SCALE OF RED	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R0
	DARK LIGHT	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R1
		0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R2
		:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	R3~R252	
		:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:		
		1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	R253	
		0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	R254	
	RED	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	R255	
GRAY SCALE OF GREEN	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	G0
	DARK LIGHT	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	G1
		0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	G2
		:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	G3~G252	
		:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:		
		0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	0	0	0	0	0	0	0	G253
		0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	G254
	GREEN	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	G255
GRAY SCALE OF BLUE	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	B0
	DARK LIGHT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	B1
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	B2
		:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	B3~B252	
		:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:		
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	B253
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	B254
	BLUE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	B255

Note) Definition of Gray :

Rn : Red Gray, Gn : Green Gray, Bn : Blue Gray (n = Gray level)

Input Signal : 0 = Low level voltage, 1 = High level voltage



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6. Interface Timing

6.1 Timing Parameters (DE only mode)

Signal	Item	Symbol	Min.	Typ.	Max.	Unit	Note
Clock	Frequency	$1/T_C$	120.0	148.5	160.0	MHz	-
Hsync		F_H	55.0	67.5	72.0	KHz	-
Vsync		F_V	-	60	-	Hz	-
Vertical Display Term	Active Display Period	T_{VD}	-	1080	-	Lines	-
	Vertical Total	T_V	1092	1125	1158	Lines	-
Horizontal Display Term	Active Display Period	T_{HD}	-	1920	-	Clocks	-
	Horizontal Total	T_H	2016	2200	2400	Clocks	-

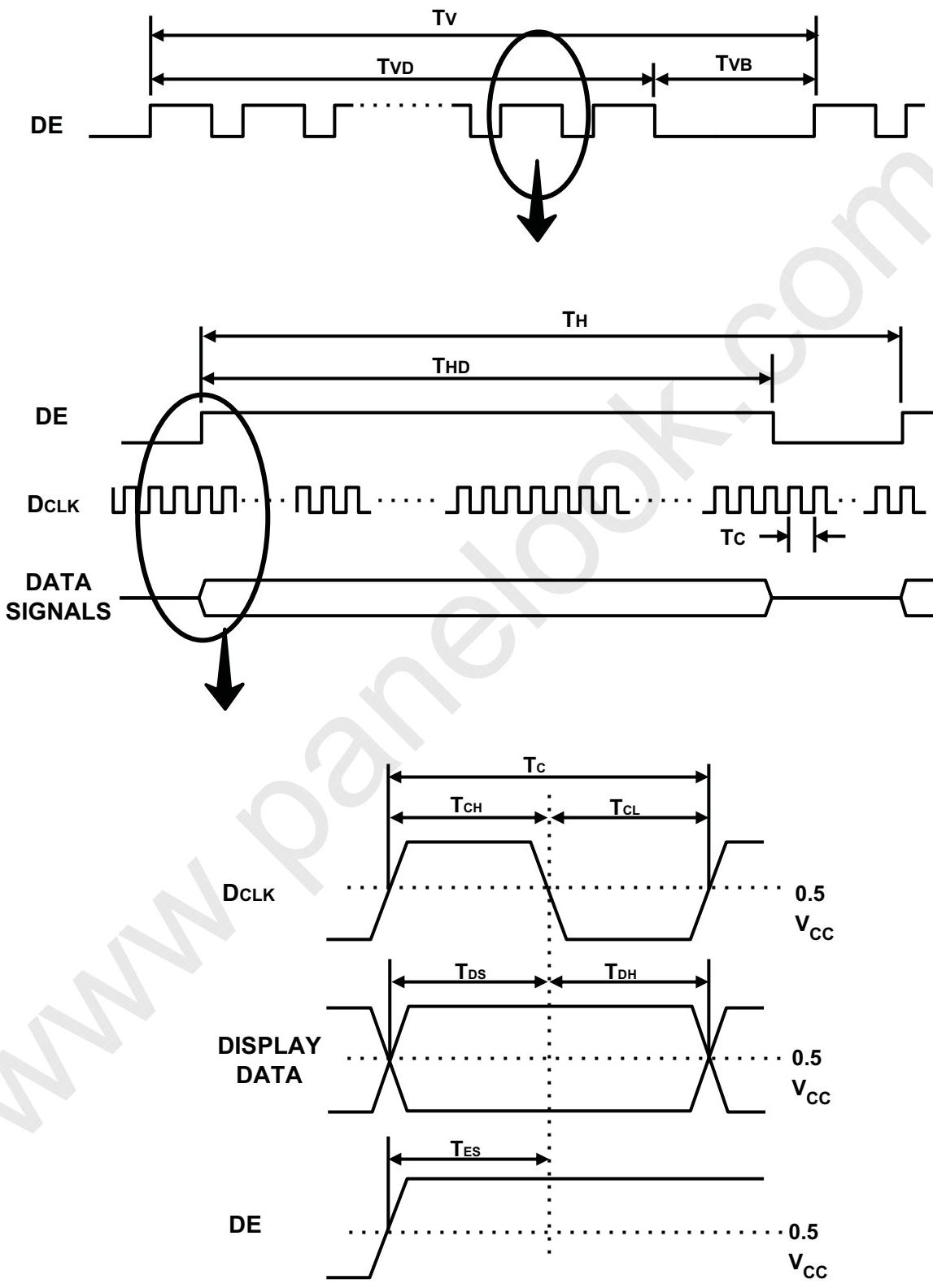
Note) This product is DE only mode. The input of Hsync & Vsync signal does not have an effect on normal operation.

Test Point : TTL control signal and CLK at LVDS Tx input terminal in system



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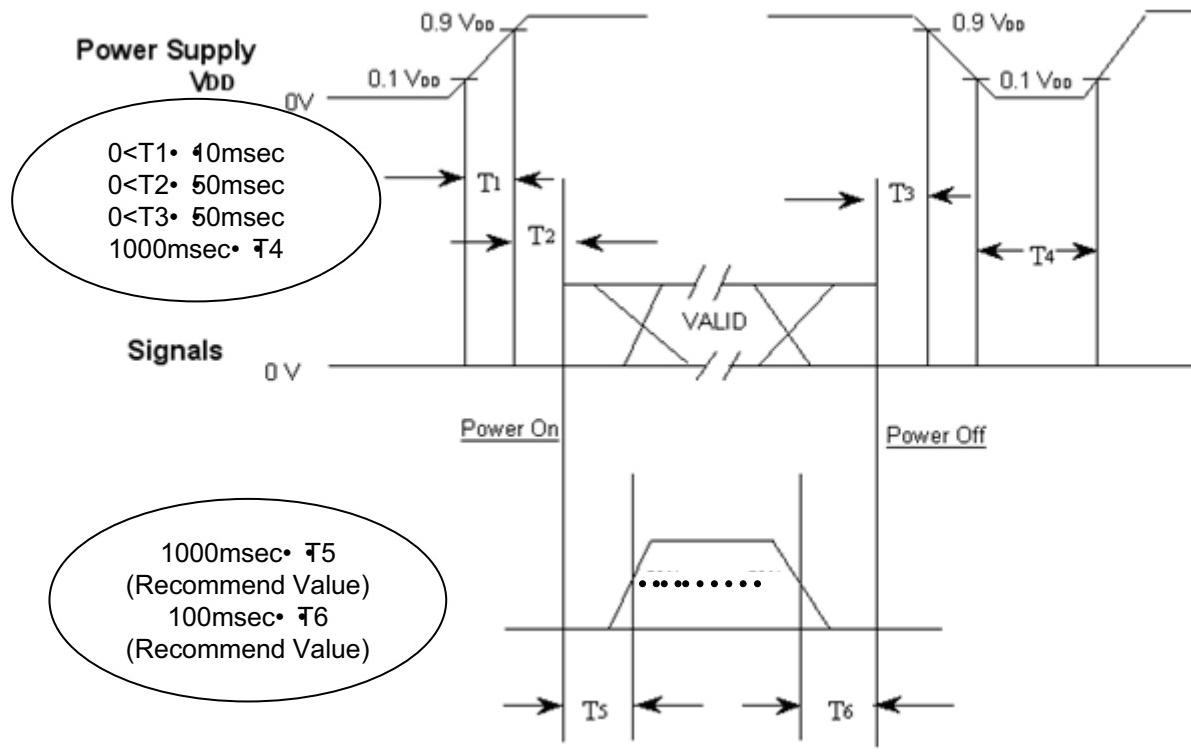
6.2 Timing diagrams of interface signal (DE only mode)



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6.3 Power ON/OFF Sequence

To prevent a latch-up or DC operation of the LCD Module, the power on/off sequence should be as the diagram below.



T_1 : V_{DD} rising time from 10% to 90%

T_2 : The time from V_{DD} to valid data at power ON.

T_3 : The time from valid data off to V_{DD} off at power Off.

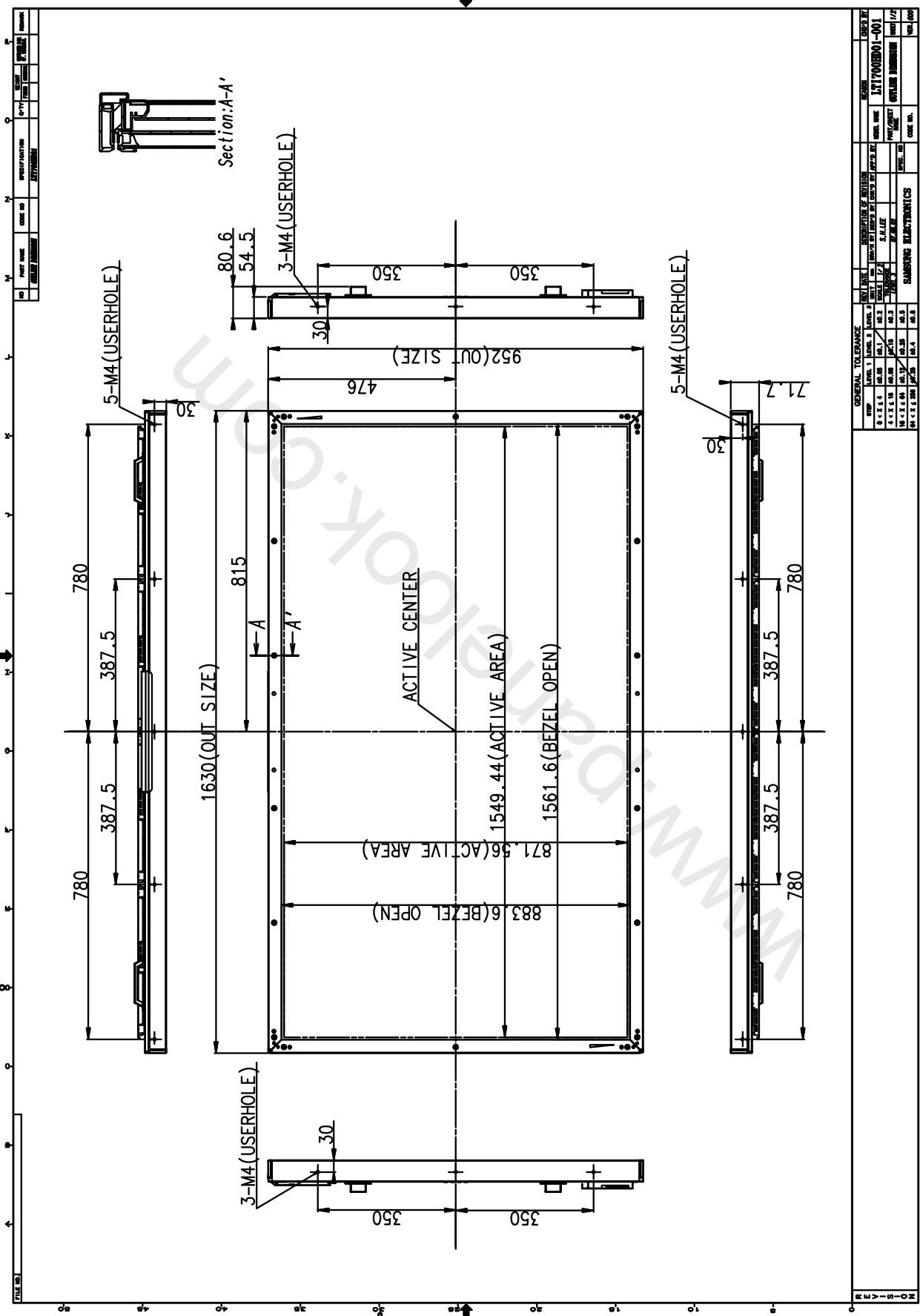
T_4 : V_{DD} off time for Windows restart

T_5 : The time from valid data to B/L enable at power ON.

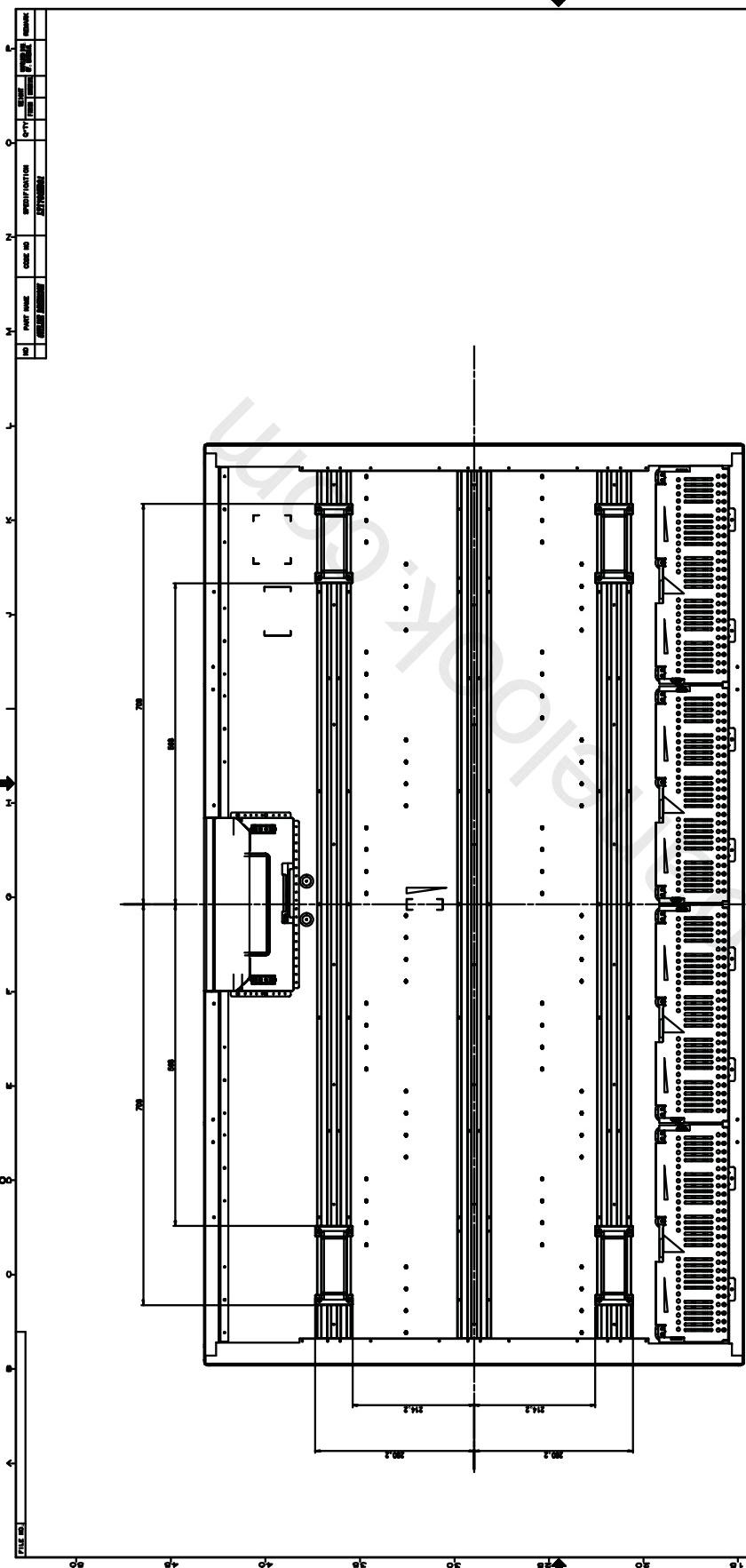
T_6 : The time from valid data off to B/L disable at power Off.

- The supply voltage of the external system for the Module input should be the same as the definition of V_{DD} .
- Apply the lamp voltage within the LCD operation range. When the backlight turns on before the LCD operation or the LCD turns off before the backlight turns off, the display may momentarily show abnormal screen.
- In case of V_{DD} = off level, please keep the level of input signals low or keep a high impedance.
- T_4 should be measured after the Module has been fully discharged between power off and on period.
- Interface signal should not be kept at high impedance when the power is on.

7. Outline Dimension (Front View)



7. Outline Dimension (Rear View)



GENERAL INFORMATION		SPECIFICATIONS		DRAWING NO.	
ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	ITEM 1	ITEM 2	ITEM 3	ITEM 4	ITEM 5
2	ITEM 6	ITEM 7	ITEM 8	ITEM 9	ITEM 10
3	ITEM 11	ITEM 12	ITEM 13	ITEM 14	ITEM 15
4	ITEM 16	ITEM 17	ITEM 18	ITEM 19	ITEM 20
5	ITEM 21	ITEM 22	ITEM 23	ITEM 24	ITEM 25
6	ITEM 26	ITEM 27	ITEM 28	ITEM 29	ITEM 30
7	ITEM 31	ITEM 32	ITEM 33	ITEM 34	ITEM 35
8	ITEM 36	ITEM 37	ITEM 38	ITEM 39	ITEM 40
9	ITEM 41	ITEM 42	ITEM 43	ITEM 44	ITEM 45
10	ITEM 46	ITEM 47	ITEM 48	ITEM 49	ITEM 50
11	ITEM 51	ITEM 52	ITEM 53	ITEM 54	ITEM 55
12	ITEM 56	ITEM 57	ITEM 58	ITEM 59	ITEM 60
13	ITEM 61	ITEM 62	ITEM 63	ITEM 64	ITEM 65
14	ITEM 66	ITEM 67	ITEM 68	ITEM 69	ITEM 70
15	ITEM 71	ITEM 72	ITEM 73	ITEM 74	ITEM 75
16	ITEM 76	ITEM 77	ITEM 78	ITEM 79	ITEM 80
17	ITEM 81	ITEM 82	ITEM 83	ITEM 84	ITEM 85
18	ITEM 86	ITEM 87	ITEM 88	ITEM 89	ITEM 90
19	ITEM 91	ITEM 92	ITEM 93	ITEM 94	ITEM 95
20	ITEM 96	ITEM 97	ITEM 98	ITEM 99	ITEM 100
21	ITEM 101	ITEM 102	ITEM 103	ITEM 104	ITEM 105
22	ITEM 106	ITEM 107	ITEM 108	ITEM 109	ITEM 110
23	ITEM 111	ITEM 112	ITEM 113	ITEM 114	ITEM 115
24	ITEM 116	ITEM 117	ITEM 118	ITEM 119	ITEM 120
25	ITEM 121	ITEM 122	ITEM 123	ITEM 124	ITEM 125
26	ITEM 126	ITEM 127	ITEM 128	ITEM 129	ITEM 130
27	ITEM 131	ITEM 132	ITEM 133	ITEM 134	ITEM 135
28	ITEM 136	ITEM 137	ITEM 138	ITEM 139	ITEM 140
29	ITEM 141	ITEM 142	ITEM 143	ITEM 144	ITEM 145
30	ITEM 146	ITEM 147	ITEM 148	ITEM 149	ITEM 150
31	ITEM 151	ITEM 152	ITEM 153	ITEM 154	ITEM 155
32	ITEM 156	ITEM 157	ITEM 158	ITEM 159	ITEM 160
33	ITEM 161	ITEM 162	ITEM 163	ITEM 164	ITEM 165
34	ITEM 166	ITEM 167	ITEM 168	ITEM 169	ITEM 170
35	ITEM 171	ITEM 172	ITEM 173	ITEM 174	ITEM 175
36	ITEM 176	ITEM 177	ITEM 178	ITEM 179	ITEM 180
37	ITEM 181	ITEM 182	ITEM 183	ITEM 184	ITEM 185
38	ITEM 186	ITEM 187	ITEM 188	ITEM 189	ITEM 190
39	ITEM 191	ITEM 192	ITEM 193	ITEM 194	ITEM 195
40	ITEM 196	ITEM 197	ITEM 198	ITEM 199	ITEM 200
41	ITEM 201	ITEM 202	ITEM 203	ITEM 204	ITEM 205
42	ITEM 206	ITEM 207	ITEM 208	ITEM 209	ITEM 210
43	ITEM 211	ITEM 212	ITEM 213	ITEM 214	ITEM 215
44	ITEM 216	ITEM 217	ITEM 218	ITEM 219	ITEM 220
45	ITEM 221	ITEM 222	ITEM 223	ITEM 224	ITEM 225
46	ITEM 226	ITEM 227	ITEM 228	ITEM 229	ITEM 230
47	ITEM 231	ITEM 232	ITEM 233	ITEM 234	ITEM 235
48	ITEM 236	ITEM 237	ITEM 238	ITEM 239	ITEM 240
49	ITEM 241	ITEM 242	ITEM 243	ITEM 244	ITEM 245
50	ITEM 246	ITEM 247	ITEM 248	ITEM 249	ITEM 250
51	ITEM 251	ITEM 252	ITEM 253	ITEM 254	ITEM 255
52	ITEM 256	ITEM 257	ITEM 258	ITEM 259	ITEM 260
53	ITEM 261	ITEM 262	ITEM 263	ITEM 264	ITEM 265
54	ITEM 266	ITEM 267	ITEM 268	ITEM 269	ITEM 270
55	ITEM 271	ITEM 272	ITEM 273	ITEM 274	ITEM 275
56	ITEM 276	ITEM 277	ITEM 278	ITEM 279	ITEM 280
57	ITEM 281	ITEM 282	ITEM 283	ITEM 284	ITEM 285
58	ITEM 286	ITEM 287	ITEM 288	ITEM 289	ITEM 290
59	ITEM 291	ITEM 292	ITEM 293	ITEM 294	ITEM 295
60	ITEM 296	ITEM 297	ITEM 298	ITEM 299	ITEM 300
61	ITEM 301	ITEM 302	ITEM 303	ITEM 304	ITEM 305
62	ITEM 306	ITEM 307	ITEM 308	ITEM 309	ITEM 310
63	ITEM 311	ITEM 312	ITEM 313	ITEM 314	ITEM 315
64	ITEM 316	ITEM 317	ITEM 318	ITEM 319	ITEM 320
65	ITEM 321	ITEM 322	ITEM 323	ITEM 324	ITEM 325
66	ITEM 326	ITEM 327	ITEM 328	ITEM 329	ITEM 330
67	ITEM 331	ITEM 332	ITEM 333	ITEM 334	ITEM 335
68	ITEM 336	ITEM 337	ITEM 338	ITEM 339	ITEM 340
69	ITEM 341	ITEM 342	ITEM 343	ITEM 344	ITEM 345
70	ITEM 346	ITEM 347	ITEM 348	ITEM 349	ITEM 350
71	ITEM 351	ITEM 352	ITEM 353	ITEM 354	ITEM 355
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74	ITEM 366	ITEM 367	ITEM 368	ITEM 369	ITEM 370
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80	ITEM 396	ITEM 397	ITEM 398	ITEM 399	ITEM 400
81	ITEM 401	ITEM 402	ITEM 403	ITEM 404	ITEM 405
82	ITEM 406	ITEM 407	ITEM 408	ITEM 409	ITEM 410
83	ITEM 411	ITEM 412	ITEM 413	ITEM 414	ITEM 415
84	ITEM 416	ITEM 417	ITEM 418	ITEM 419	ITEM 420
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87	ITEM 431	ITEM 432	ITEM 433	ITEM 434	ITEM 435
88	ITEM 436	ITEM 437	ITEM 438	ITEM 439	ITEM 440
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90	ITEM 446	ITEM 447	ITEM 448	ITEM 449	ITEM 450
91	ITEM 451	ITEM 452	ITEM 453	ITEM 454	ITEM 455
92	ITEM 456	ITEM 457	ITEM 458	ITEM 459	ITEM 460
93	ITEM 461	ITEM 462	ITEM 463	ITEM 464	ITEM 465
94	ITEM 466	ITEM 467	ITEM 468	ITEM 469	ITEM 470
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96	ITEM 476	ITEM 477	ITEM 478	ITEM 479	ITEM 480
97	ITEM 481	ITEM 482	ITEM 483	ITEM 484	ITEM 485
98	ITEM 486	ITEM 487	ITEM 488	ITEM 489	ITEM 490
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100	ITEM 496	ITEM 497	ITEM 498	ITEM 499	ITEM 500
101	ITEM 501	ITEM 502	ITEM 503	ITEM 504	ITEM 505
102	ITEM 506	ITEM 507	ITEM 508	ITEM 509	ITEM 510
103	ITEM 511	ITEM 512	ITEM 513	ITEM 514	ITEM 515
104	ITEM 516	ITEM 517	ITEM 518	ITEM 519	ITEM 520
105	ITEM 521	ITEM 522	ITEM 523	ITEM 524	ITEM 525
106	ITEM 526	ITEM 527	ITEM 528	ITEM 529	ITEM 530
107	ITEM 531	ITEM 532	ITEM 533	ITEM 534	ITEM 535
108	ITEM 536	ITEM 537	ITEM 538	ITEM 539	ITEM 540
109	ITEM 541	ITEM 542	ITEM 543	ITEM 544	ITEM 545
110	ITEM 546	ITEM 547	ITEM 548	ITEM 549	ITEM 550
111	ITEM 551	ITEM 552	ITEM 553	ITEM 554	ITEM 555
112	ITEM 556	ITEM 557	ITEM 558	ITEM 559	ITEM 560
113	ITEM 561	ITEM 562	ITEM 563	ITEM 564	ITEM 565
114	ITEM 566	ITEM 567	ITEM 568	ITEM 569	ITEM 570
115	ITEM 571	ITEM 572	ITEM 573	ITEM 574	ITEM 575
116	ITEM 576	ITEM 577	ITEM 578	ITEM 579	ITEM 580
117	ITEM 581	ITEM 582	ITEM 583	ITEM 584	ITEM 585
118	ITEM 586	ITEM 587	ITEM 588	ITEM 589	ITEM 590
119	ITEM 591	ITEM 592	ITEM 593	ITEM 594	ITEM 595
120	ITEM 596	ITEM 597	ITEM 598	ITEM 599	ITEM 600
121	ITEM 601	ITEM 602	ITEM 603	ITEM 604	ITEM 605
122	ITEM 606	ITEM 607	ITEM 608	ITEM 609	ITEM 610
123	ITEM 611	ITEM 612	ITEM 613	ITEM 614	ITEM 615
124	ITEM 616	ITEM 617	ITEM 618	ITEM 619	ITEM 620
125	ITEM 621	ITEM 622	ITEM 623	ITEM 624	ITEM 625
126	ITEM 626	ITEM 627	ITEM 628	ITEM 629	ITEM 630
127	ITEM 631	ITEM 632	ITEM 633	ITEM 634	ITEM 635
128	ITEM 636	ITEM 637	ITEM 638	ITEM 639	ITEM 640
129	ITEM 641	ITEM 642	ITEM 643	ITEM 644	ITEM 645
130	ITEM 646	ITEM 647	ITEM 648	ITEM 649	ITEM 650
131	ITEM 651	ITEM 652	ITEM 653	ITEM 654	ITEM 655
132	ITEM 656	ITEM 657	ITEM 658	ITEM 659	ITEM 660
133	ITEM 661	ITEM 662	ITEM 663	ITEM 664	ITEM 665
134	ITEM 666	ITEM 667	ITEM 668	ITEM 669	ITEM 670
135	ITEM 671	ITEM 672	ITEM 673	ITEM 674	ITEM 675
136	ITEM 676	ITEM 677	ITEM 678	ITEM 679	ITEM 680
137	ITEM 681	ITEM 682	ITEM 683	ITEM 684	ITEM 685
138	ITEM 686	ITEM 687	ITEM 688	ITEM 689	ITEM 690
139	ITEM 691	ITEM 692	ITEM 693	ITEM 694	ITEM 695
140	ITEM 696	ITEM 697	ITEM 698	ITEM 699	ITEM 700
141	ITEM 701	ITEM 702	ITEM 703	ITEM 704	ITEM 705
142	ITEM 706	ITEM 707	ITEM 708	ITEM 709	ITEM 710
143	ITEM 711	ITEM 712	ITEM 713	ITEM 714	ITEM 715
144	ITEM 716	ITEM 717	ITEM 718	ITEM 719	ITEM 720
145	ITEM 721	ITEM 722	ITEM 723	ITEM 724	ITEM 725
146	ITEM 726	ITEM 727	ITEM 728	ITEM 729	ITEM 730
147	ITEM 731	ITEM 732	ITEM 733	ITEM 734	ITEM 735
148	ITEM 736	ITEM 737	ITEM 738	ITEM 739	ITEM 740
149	ITEM 741	ITEM 742	ITEM 743	ITEM 744	ITEM 745
150	ITEM 746	ITEM 747	ITEM 748	ITEM 749	ITEM 750
151	ITEM 751	ITEM 752	ITEM 753	ITEM 754	ITEM 755
152	ITEM 756	ITEM 757	ITEM 758	ITEM 759	ITEM 760
153	ITEM 761	ITEM 762	ITEM 763	ITEM 764	ITEM 765
154	ITEM 766	ITEM 767	ITEM 768	ITEM 769	ITEM 770
155	ITEM 771	ITEM 772	ITEM 773	ITEM 774	ITEM 775
156	ITEM 776	ITEM 777	ITEM 778	ITEM 779	ITEM 780
157	ITEM 781	ITEM 782	ITEM 783	ITEM 784	ITEM 785
158	ITEM 786	ITEM 787	ITEM 788	ITEM 789	ITEM 790
159	ITEM 791	ITEM 792	ITEM 793	ITEM 794	ITEM 795
160	ITEM 796	ITEM 797	ITEM 798	ITEM 799	ITEM 800
161	ITEM 801	ITEM 802	ITEM 803	ITEM 804	ITEM 805
162	ITEM 806	ITEM 807	ITEM 808	ITEM 809	ITEM 810
163	ITEM 811	ITEM 812	ITEM 813	ITEM 814	ITEM 815
164	ITEM 816	ITEM 817	ITEM 818	ITEM 819	ITEM 820
165	ITEM 821	ITEM 822	ITEM 823	ITEM 824	ITEM 825
166	ITEM 826	ITEM 827	ITEM 828	ITEM 829	ITEM 830
167	ITEM 831	ITEM 832	ITEM 833	ITEM 834	ITEM 835
168	ITEM 836	ITEM 837	ITEM 838	ITEM 839	ITEM 840
169	ITEM 841	ITEM 842	ITEM 843	ITEM 844	ITEM 845
170	ITEM 846	ITEM 847	ITEM 848	ITEM 849	ITEM 850
171	ITEM 851	ITEM 852	ITEM 853	ITEM 854	ITEM 855
172	ITEM 856	ITEM 857	ITEM 858	ITEM 859	ITEM 860
173	ITEM 861	ITEM 862	ITEM 863	ITEM 864	ITEM 865
174	ITEM 866				

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8. PACKING

8.1 CARTON (Internal Package)

(1) Packing Form

Corrugated fiberboard box and corrugated cardboard as shock absorber

(2) Packing Method

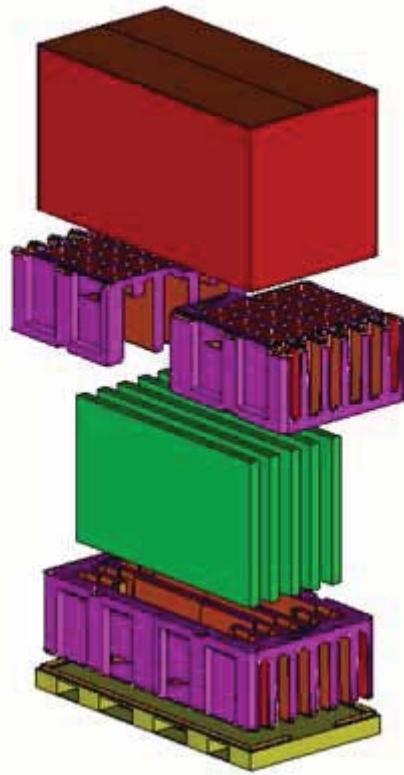
Packing
-Pallet Box

Cushion-Foam

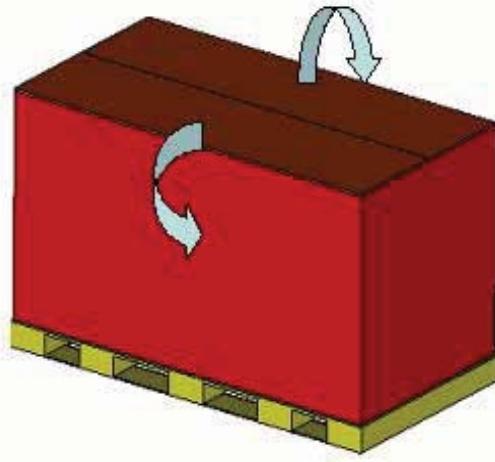
LCD Module

Cushion-Foam

Pallet-Plastic



→Direction: be able to open it



8.2 Packing Specification

Item	Specification	Remark
LCD Packing	5ea / (Packing-Pallet Box)	1. 235 Kg / LCD (5ea) 2. 23.2 Kg / Cushion-pallet (4ea) 3. 14 Kg / Packing-Pallet Box (1ea) 4. Cushion-pallet Material : EPS 5. Packing-Pallet Box Material : DW4
Pallet	1Box / Pallet	1. Pallet weight = 15 Kg
Packing Direction	Vertical	
Total Pallet Size	H x V x height	2025mm(H) x 1050mm(V) x 1205mm(height)
Total Pallet Weight	287.2 Kg	Pallet(15kg) + Module(235kg) + Cushion(23.2kg) + Pallet-BOX(14kg)

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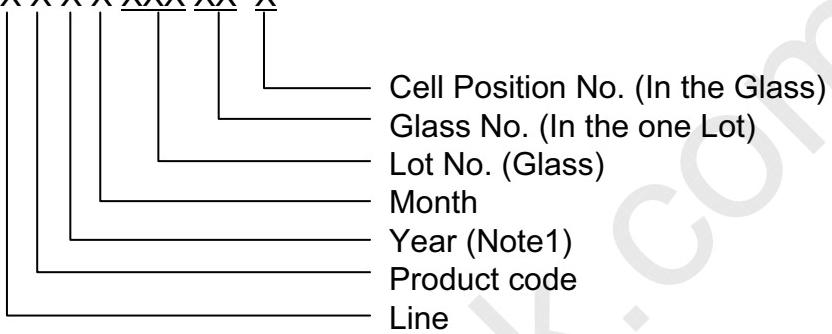
10. MARKING & OTHERS

A nameplate bearing followed by is affixed to a shipped product at the specified location on each product.

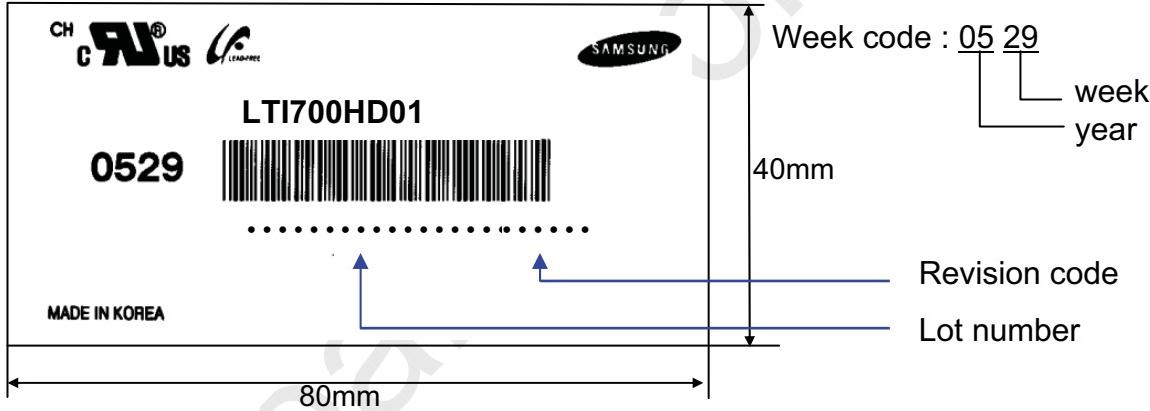
(1) Part number : LTI700HD01

(2) Revision: Three letters

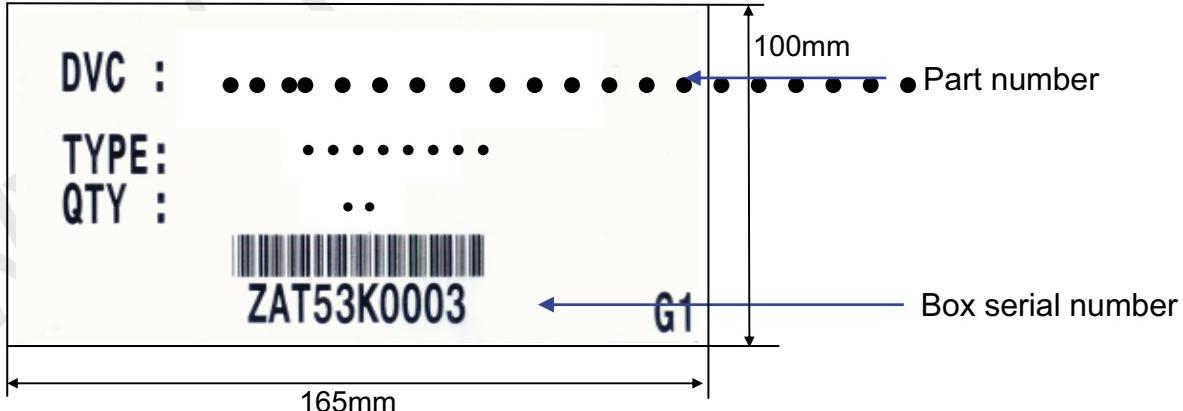
(3) Lot number : X X X X XXX XX X



(4) Nameplate Indication



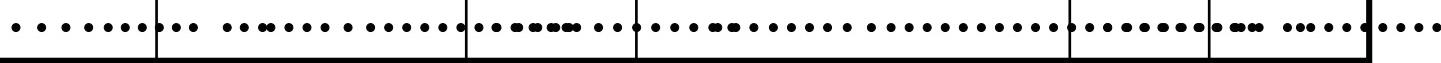
(5) Packing box attach



(6) Others

1. After service part

Lamps cannot be replaced because of the narrow bezel structure.



10. General Precautions

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10.1 Handling

- (a) When the Module is assembled, it should be attached to the system firmly using all mounting holes. Be careful not to twist and bend the Module.
- (b) Because the inverter use high voltage, it should be disconnected from power before it is assembled or disassembled.
- (c) Refrain from strong mechanical shock and / or any force to the Module.
In addition to damage, this may cause improper operation or damage to the Module and CCFT backlight.
- (d) Note that polarizers are very fragile and could be damage easily.
Do not press or scratch the surface harder than a HB pencil lead.
- (e) Wipe off water droplets or oil immediately. If you leave the droplets for a long time, staining or discoloration may occur.
- (f) If the surface of the polarizer is dirty, clean it using absorbent cotton or soft cloth.
- (g) Desirable cleaners are water, IPA(Isopropyl Alcohol) or Hexane.
Do not use Ketone type materials(ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.
- (h) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth . In case of contact with hands, legs or clothes, it must be washed away with soap thoroughly.
- (i) Protect the Module from static, or the CMOS Gate Array IC would be damaged.
- (j) Use finger-stalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.
- (k) Do not disassemble the Module.
- (l) Do not adjust the variable resistor located on the Module.
- (m) Protection film for polarizer on the Module should be slowly peeled off just before use so that the electrostatic charge can be minimized.
- (n) Pins of I/F connector should not be touched directly with bare hands.



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10.2 Storage

- (a) Do not leave the Module in high temperature, and high humidity for a long time.
It is highly recommended to store the Module with temperature from 0 to 35° •
and relative humidity of less than 70%.
- (b) Do not store the TFT-LCD Module in direct sunlight.
- (c) The Module should be stored in a dark place. It is prohibited to apply sunlight or
fluorescent light in storing.

10.3 Operation

- (a) Do not connect or disconnect the Module in the "Power On" condition.
- (b) Power supply should always be turned on/off by the "Power on/off sequence"
- (c) Module has high frequency circuits. Sufficient suppression to the electromagnetic
interference should be done by system manufacturers.
Grounding and shielding methods may be important to minimize the interference.
- (d) The cable between the backlight connector and its inverter power supply should
be connected directly with a minimized length. A longer cable between the backlight
and the inverter may cause lower luminance of lamp(CCFT) and may require
higher startup voltage(Vs).

10.4 Operation Condition Guide

- (a) The LCD product should be operated under normal conditions.
Normal condition is defined as below;
 - Temperature : 20° 15° •
 - Humidity : 55° 20%
 - Display pattern : continually changing pattern (Not stationary)
- (b) If the product will be used in extreme conditions such as high temperature, humidity,
display patterns or operation time etc., It is strongly recommended to contact SEC
for Application engineering advice. Otherwise, its reliability and function may not be
guaranteed. Extreme conditions are commonly found at Airports, Transit Stations,
Banks, Stock market, and Controlling systems.



10.5 Others

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- (a) Ultra-violet ray filter is necessary for outdoor operation.
- (b) Module should be turned clockwise (regular front view perspective) when used in portrait mode
- (c) Avoid condensation of water. It may result in improper operation or disconnection of electrode.
- (d) Do not exceed the absolute maximum rating value. (supply voltage variation, input voltage variation, variation in part contents and environmental temperature, and so on)
Otherwise the Module may be damaged.
- (e) If the Module keeps displaying the same pattern for a long period of time, the image may be "sticked" to the screen.
To avoid image sticking, it is recommended to use a screen saver.
- (f) This Module has its circuitry PCB's on the rear side and should be handled carefully in order not to be stressed.
- (g) Please contact SEC in advance when you display the same pattern for a long time.

